Earth System Research Laboratory
Physical Sciences Division

CIRES

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Seasonal Outlook into early 2012

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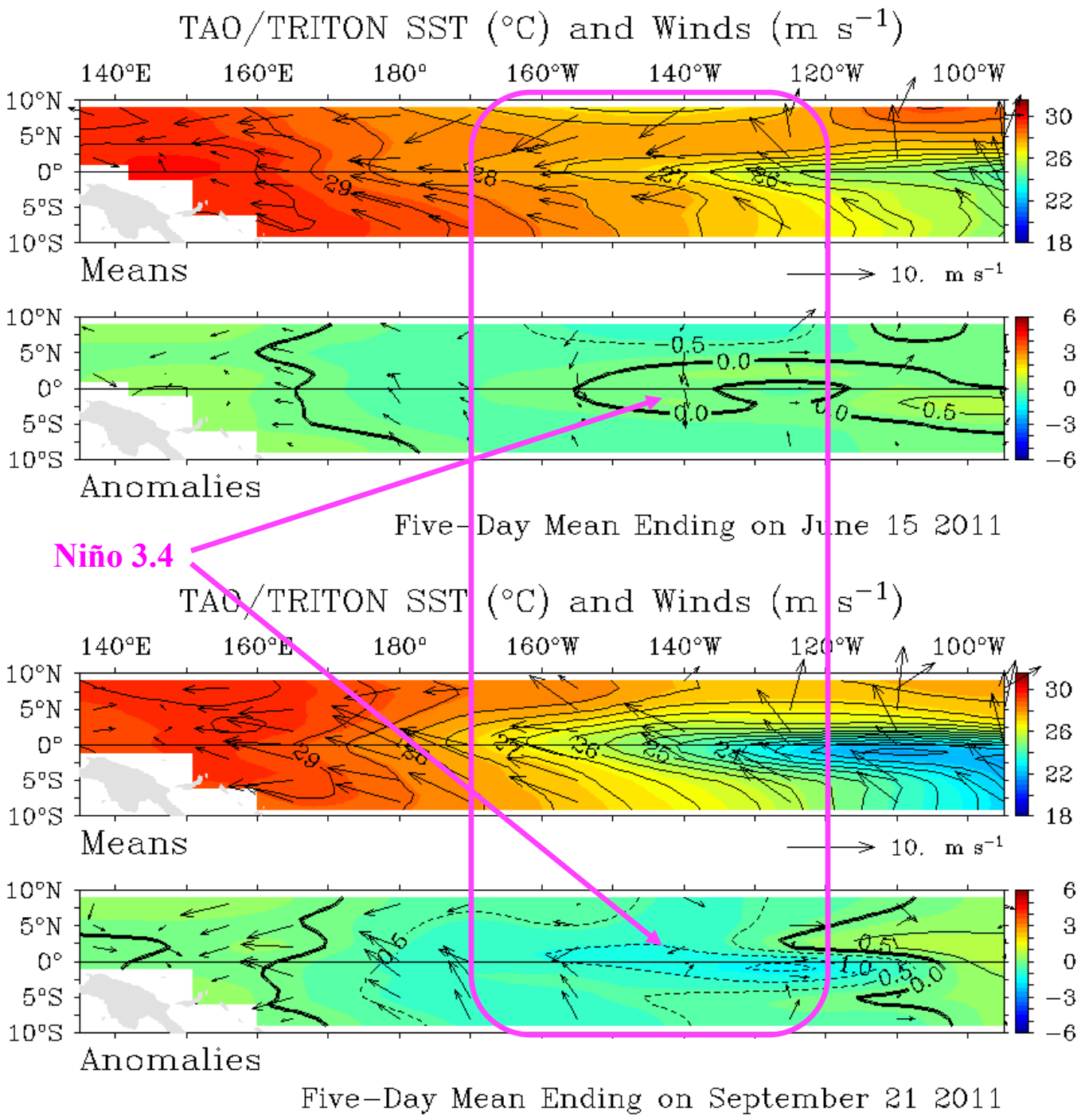
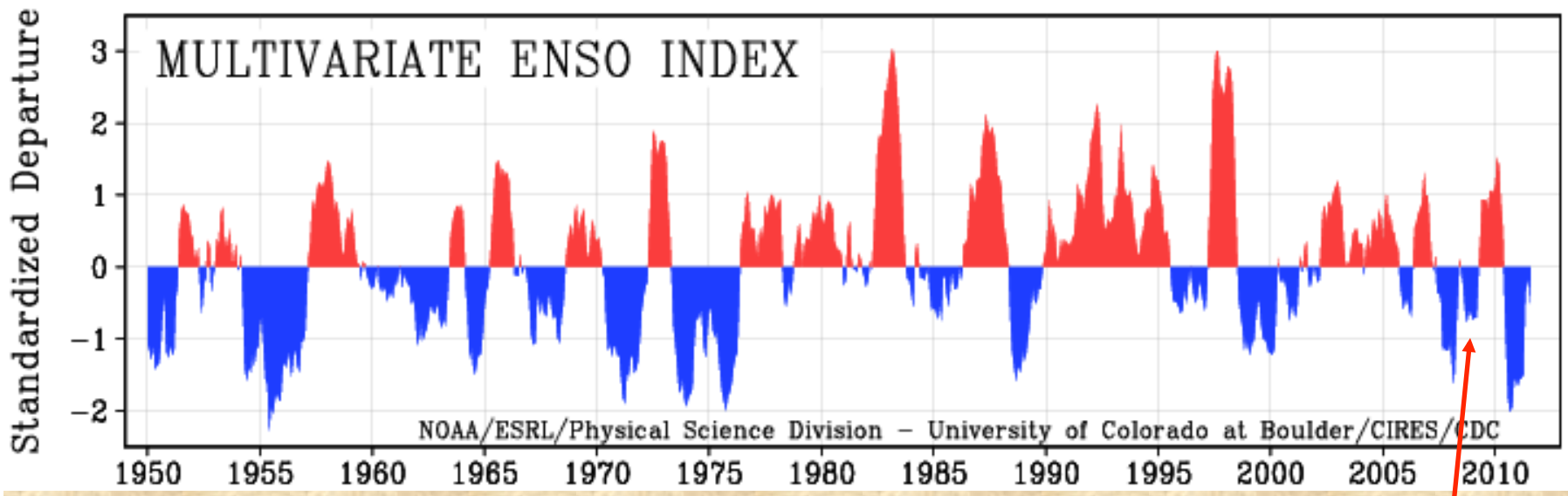
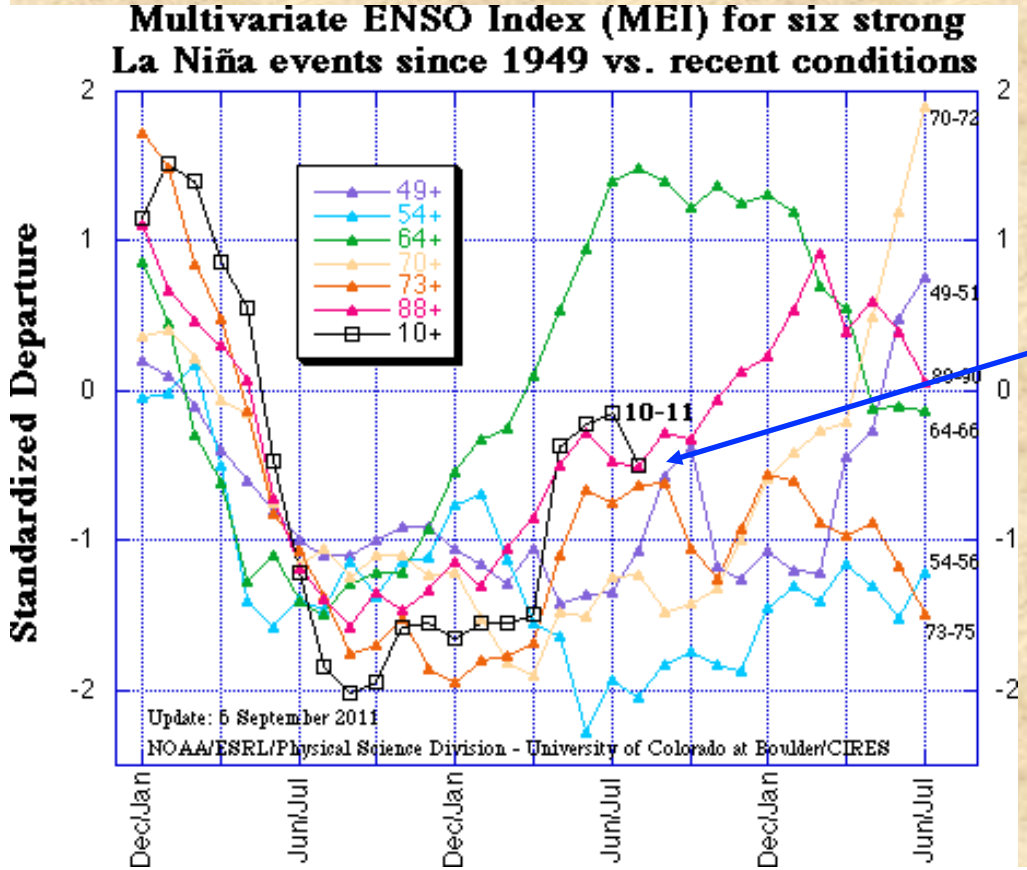
- **La Niña has indeed returned from its summer vacation**
- **What does that mean for us?**
- **Expectations for next two weeks**
- **CPC forecasts from October '11 through March '12**
- **Experimental Seasonal Forecast Guidance (ditto)**
- **Executive Summary**

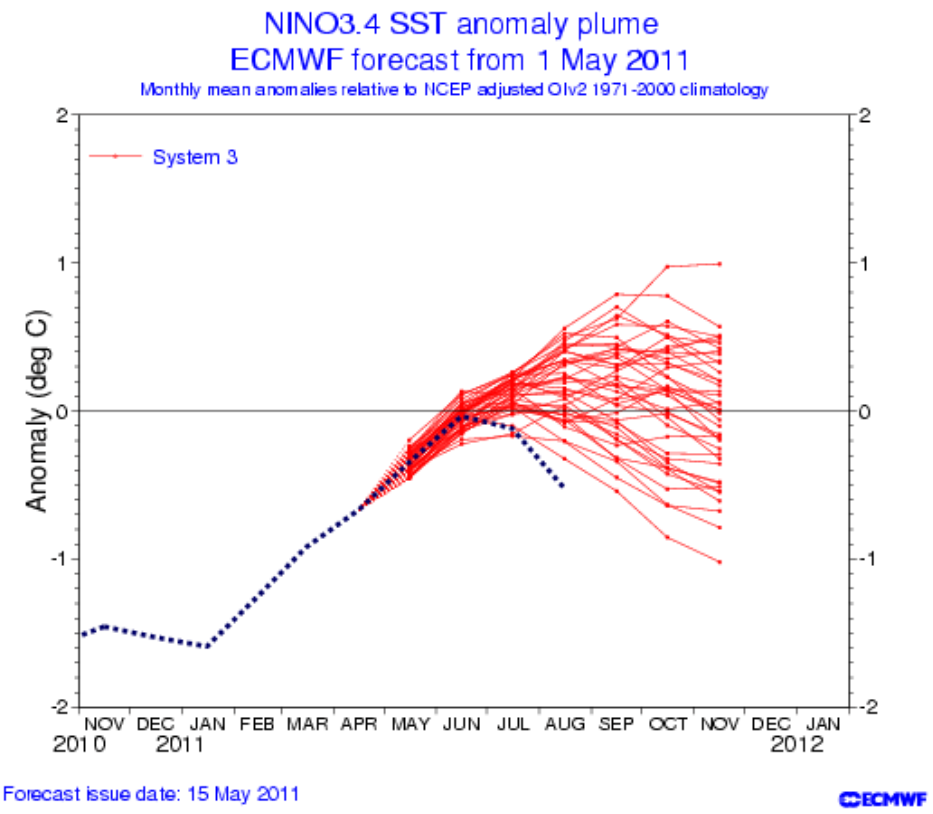
Current state of El Niño/Southern Oscillation (ENSO) phenomenon (bottom), compared to three months ago (top): La Niña has made a modest comeback last month. This includes enhanced trade winds near the dateline, and below-normal SST in central tropical Pacific, especially just west of 120W.





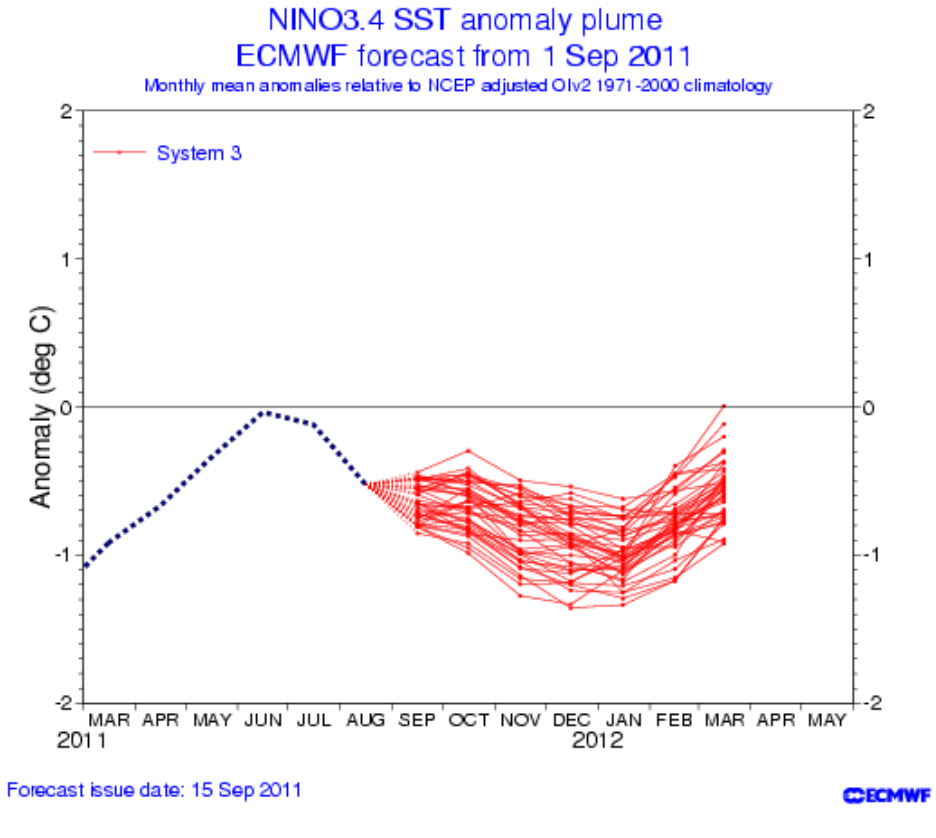


Here we go again, La Niña is coming back for an encore performance, just like in 2008, 1999, 1974, 1971, 1955, 1950,…

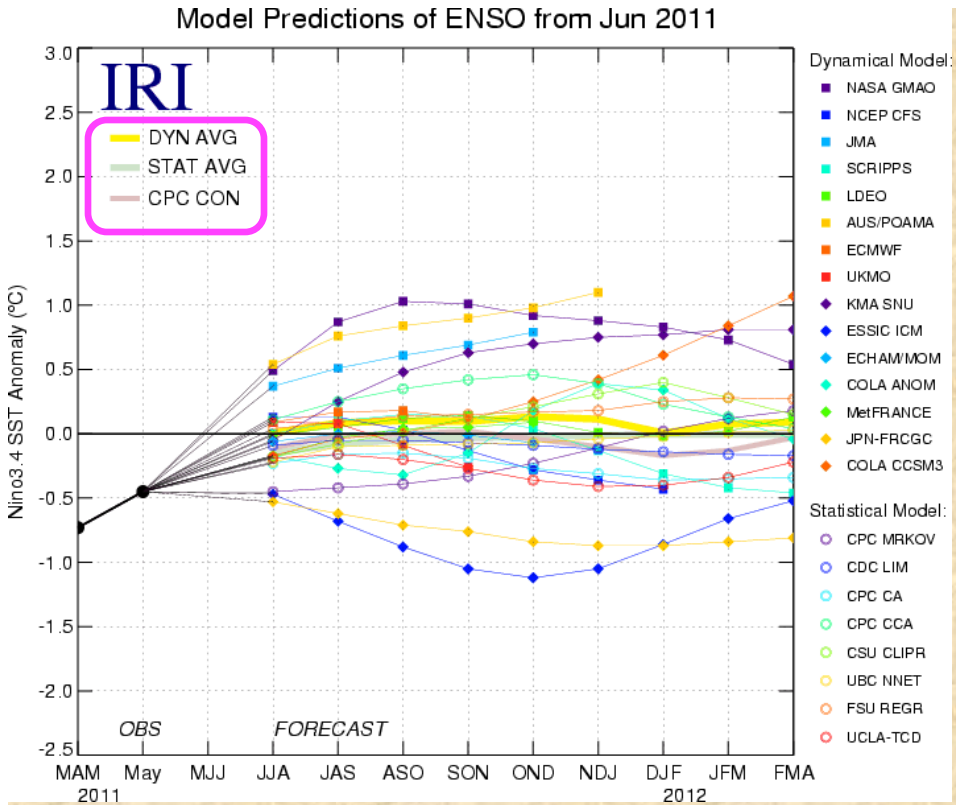


ECMWF forecast from May 2011(left): Correct anticipation of warm-up through June, but missed the reappearance of La Niña conditions after that;

A not-yet published paper that has evaluated every model over the last decade has confirmed that ECMWF is the 'gold standard' in this business.

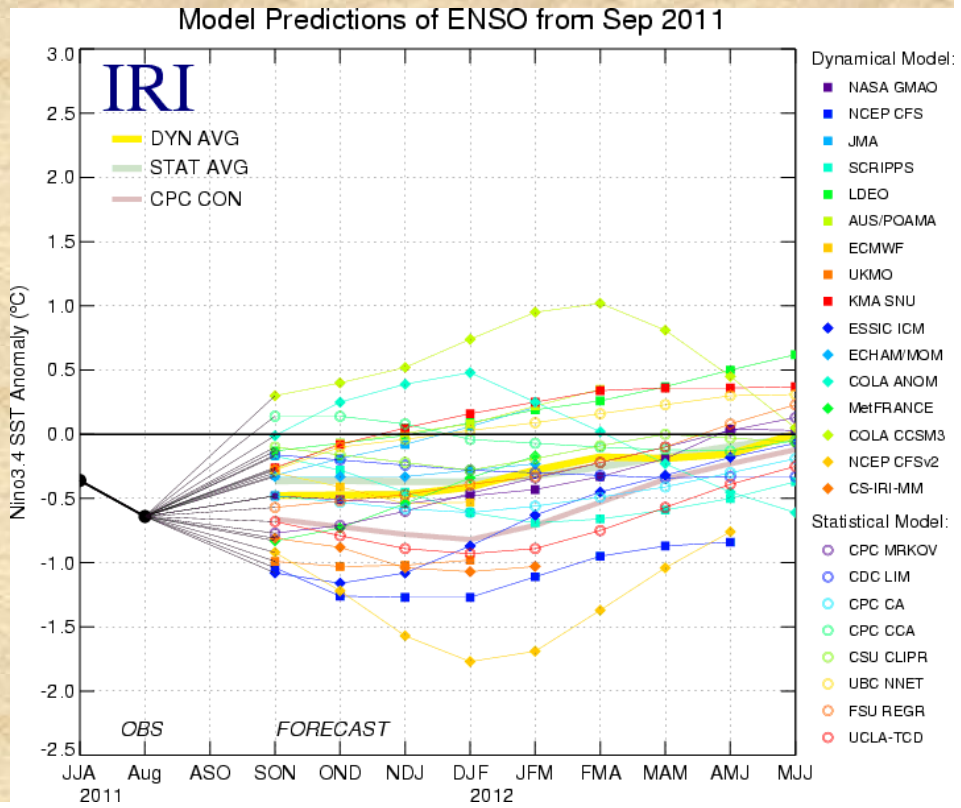


The most recent forecast (right) shows moderate La Niña conditions this winter, with no chance of El Niño or even ENSO-neutral before February 2012.



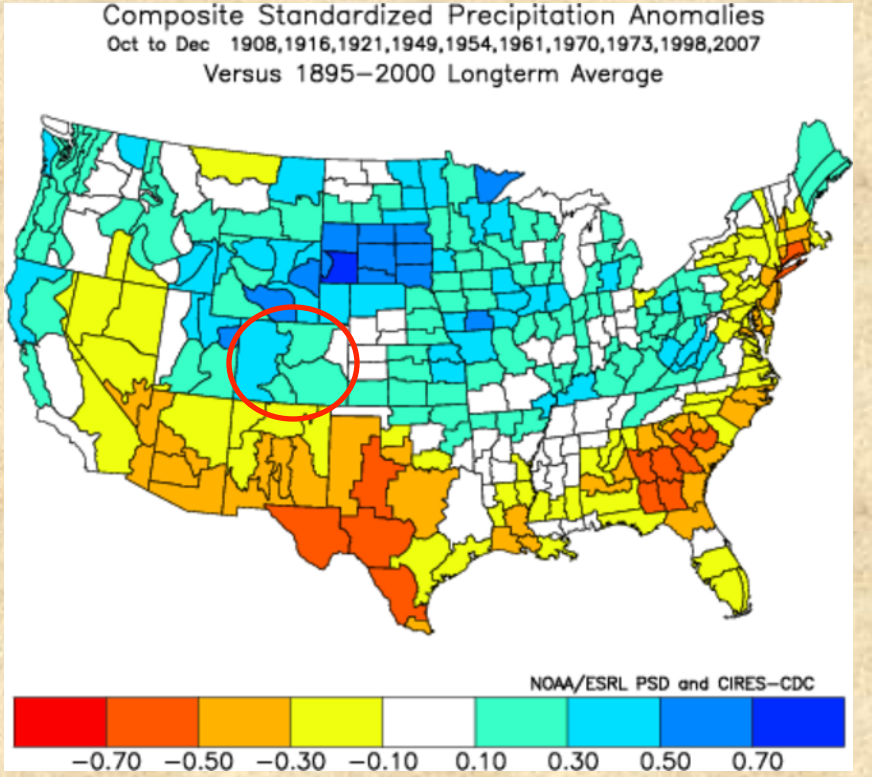
ENSO forecasts from 15 dynamical & 8 statistical forecast models in June 2011 (left): Transition to ENSO-neutral by early summer (√), then wide open outcome for rest of 2011;

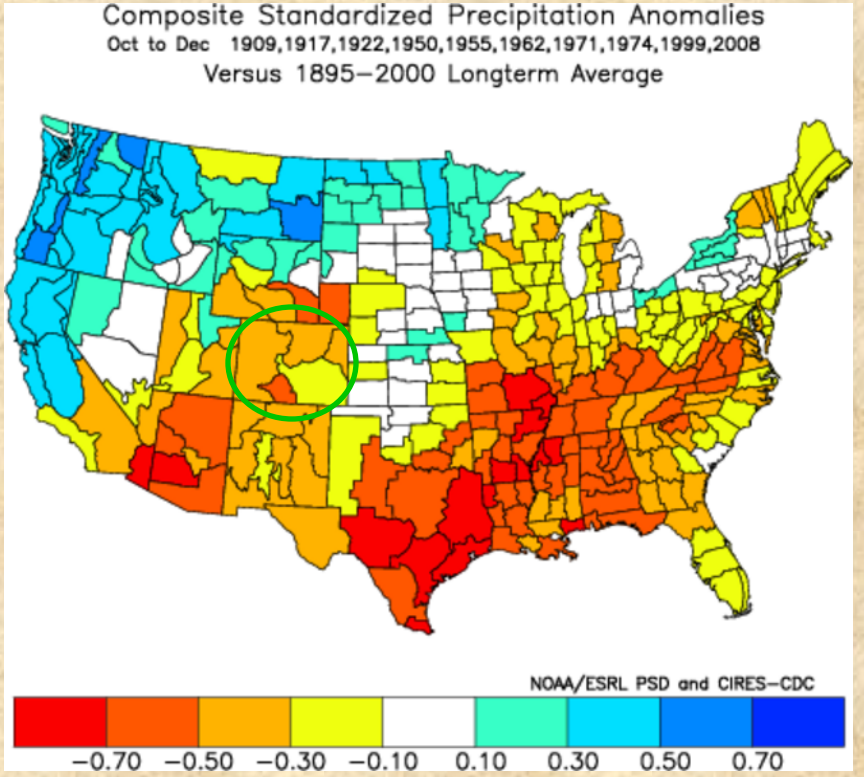
On average, dynamical models a bit warmer than statistical models, insignificant differences overall.

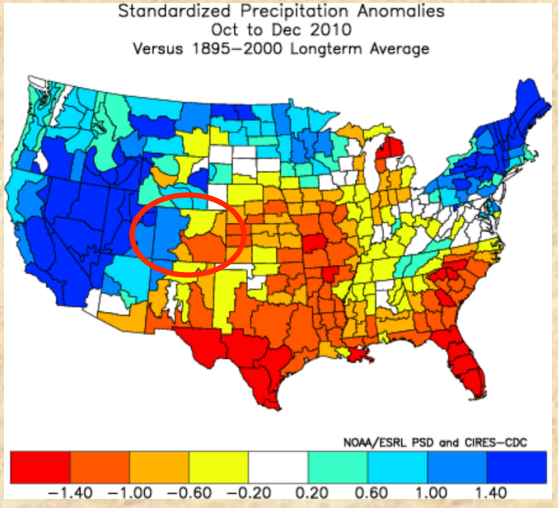


The most recent forecast collection (right) shows a shift towards La Niña, although only half of the models reach the 'magic' -0.5C threshold; meanwhile, the latest available PDO-value (July) remains negative, having proven itself yet again to be consistent with the return of La Niña...

1st vs 2nd Yr La Niña composites for October-December



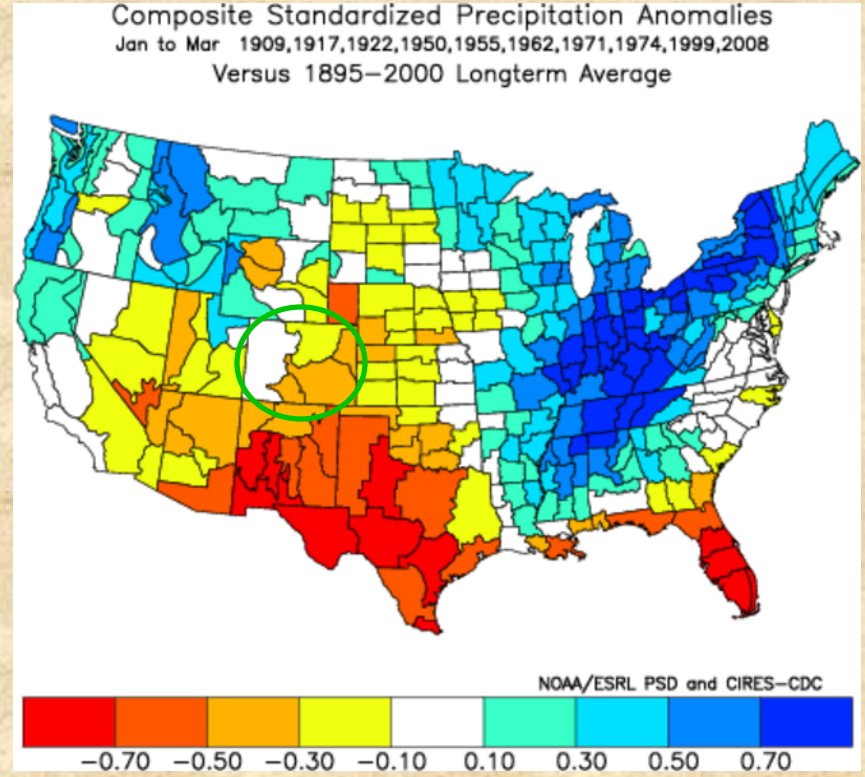


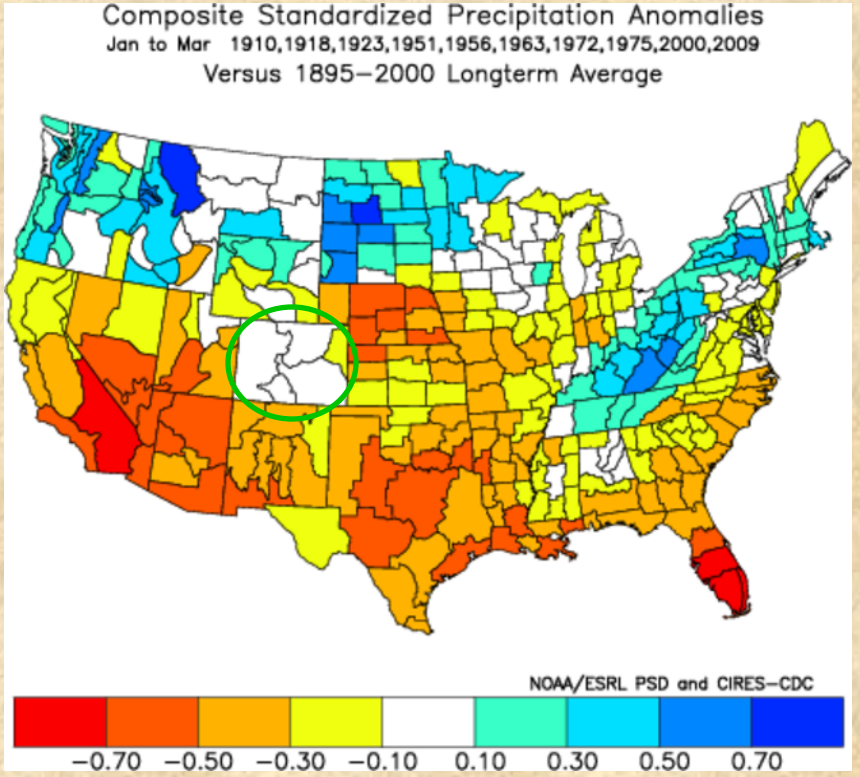


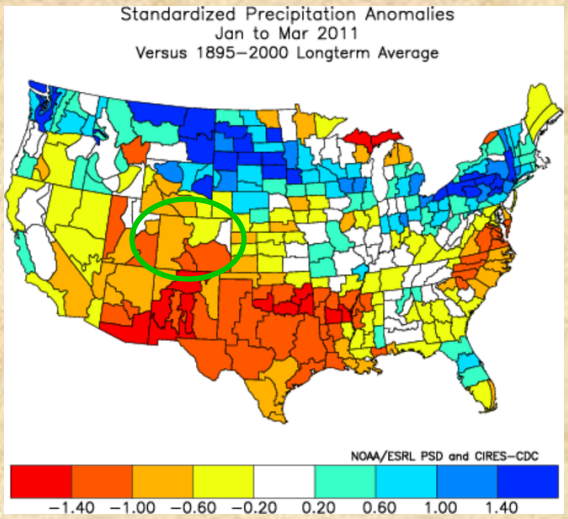
Compared to the typical outcome of La Niña fall seasons (top left), Oct-Dec 2010 (bottom left) ended up with the same preference for wet conditions in western CO, while drought conditions were more severe in SE CO than is typical for La Niña.

Autumn 2011 may end up drier than in 2010 for much of our state (top right). This is based on the same set of double-dip Las Niñas as presented last October.

1st vs 2nd Yr La Niña composites for January-March



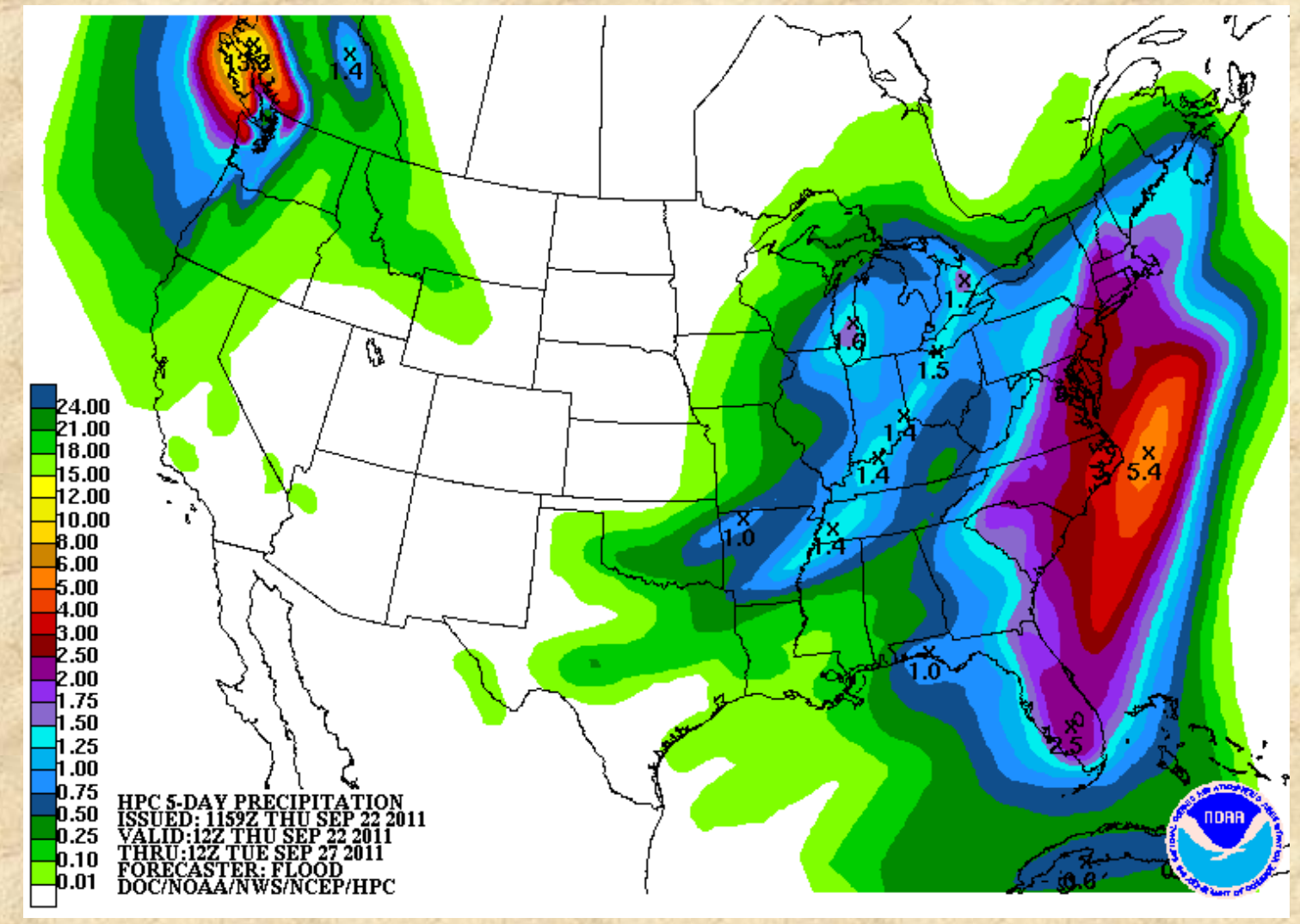




Compared to the typical outcome of La Niña winter seasons (top left), Jan-Mar '11 (bottom left) ended up close to (dry) expectations (this does not monitor mountains snowpack), especially in SE CO.

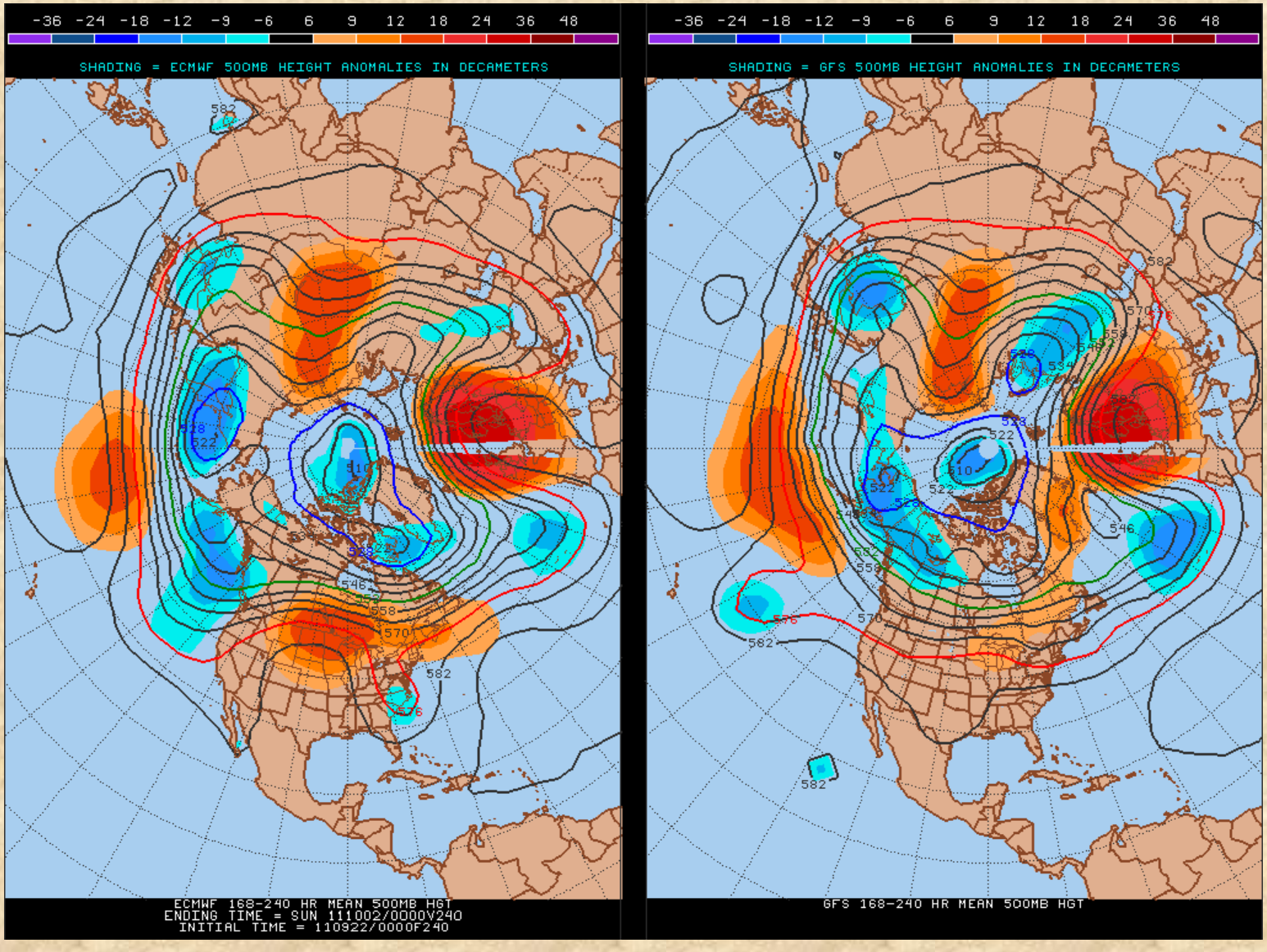
The upcoming winter season shows no signal (top right), which may be our 'opening' for a possible rebound after a dry fall. This is based on same set of double-dip Las Niñas as before.

What can we expect in the next five days?



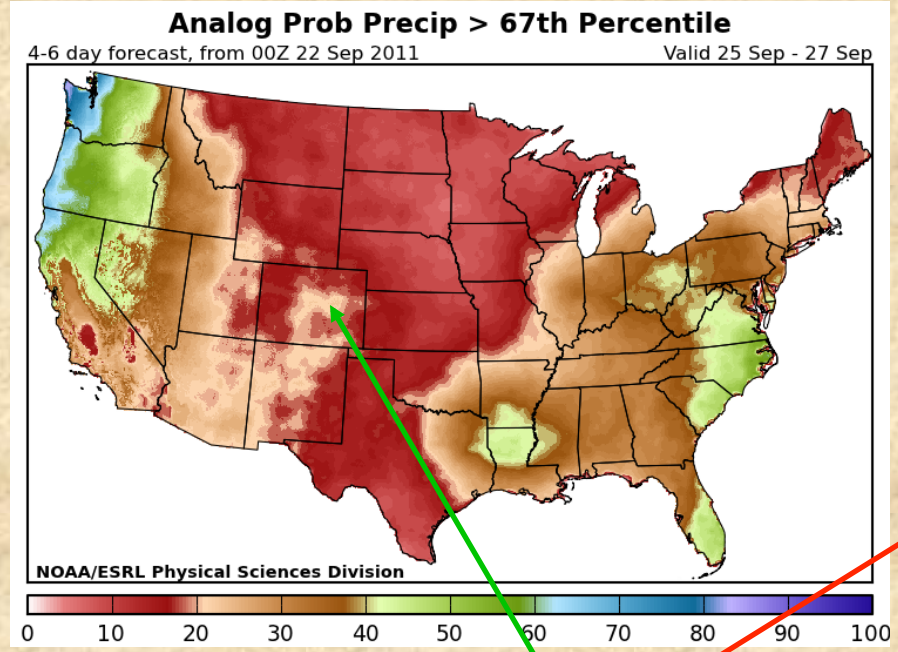
Expected precipitation amounts for the next five days, according to Hydrological Prediction Center (NOAA-HPC) –sure looks dry for the weekend…

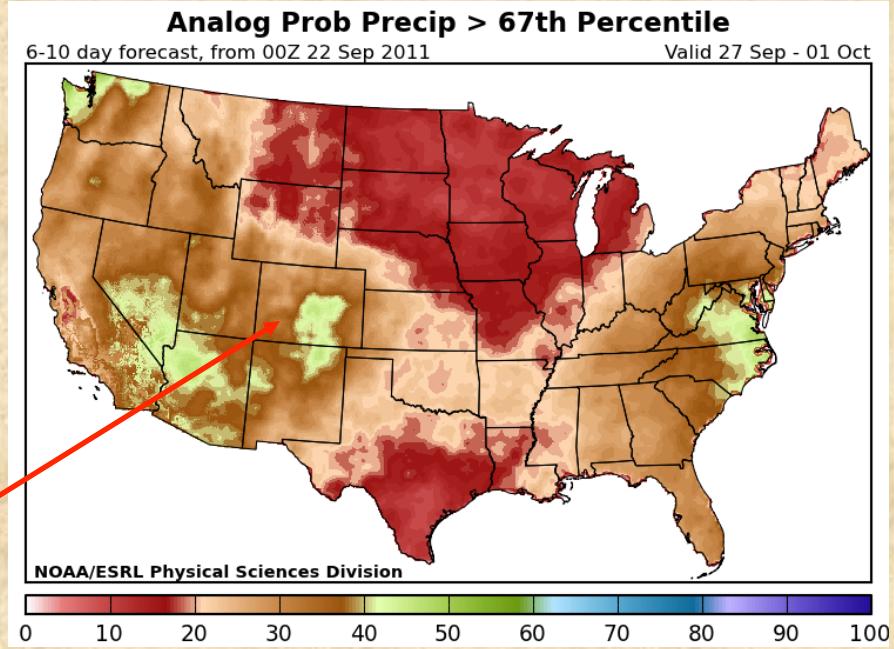
What can we expect next week and beyond?



European model shows mid-continent ridging 8-10 days out from last night – keeping us dry and mild, while the American model is further along in replacing the ridge with westerly flow.

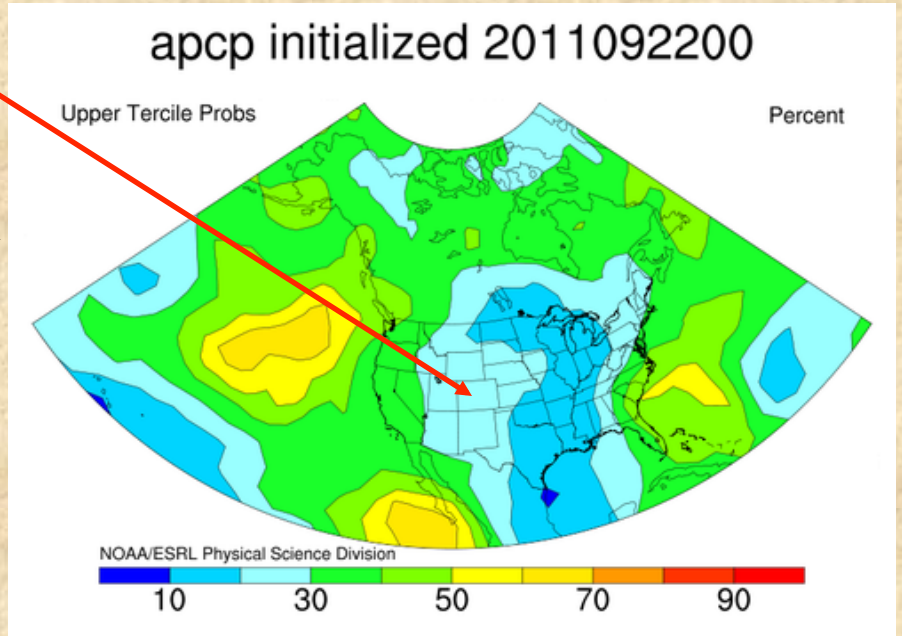
What can we expect in the next two weeks?



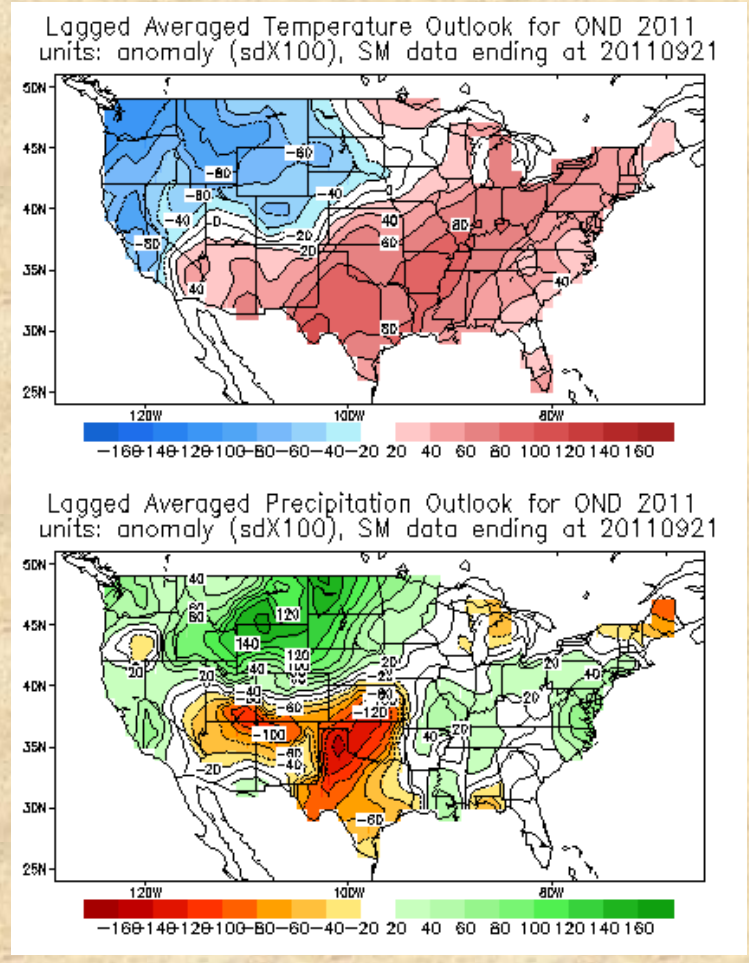


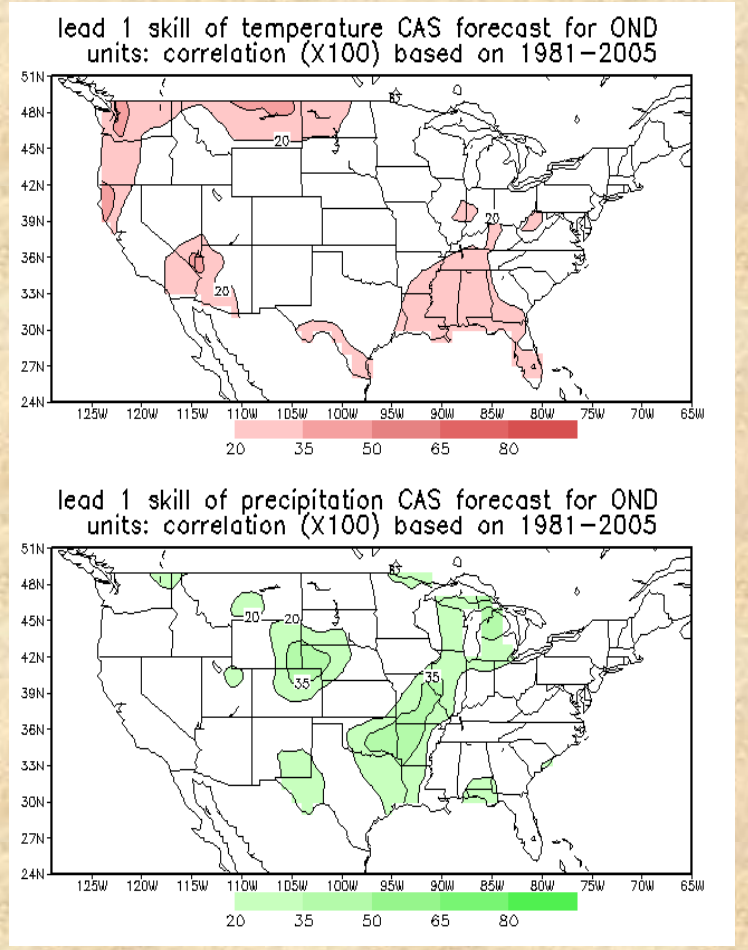
Precipitation chances for 4-6, 6-10, and 8-14 days from today show poor chances for precipitation early next week (top); close to 'normal' for next weekend (top right), and back to drier than 'normal' by "Week 2" (right).

Temperatures are expected to rise above normal over the weekend and staying mild beyond that, delaying the onset of winter snowpack conditions.



Climate Prediction Center 'Analog' Forecasts

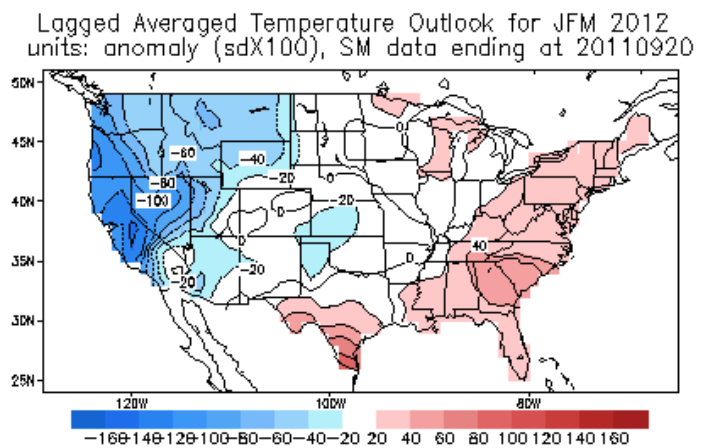


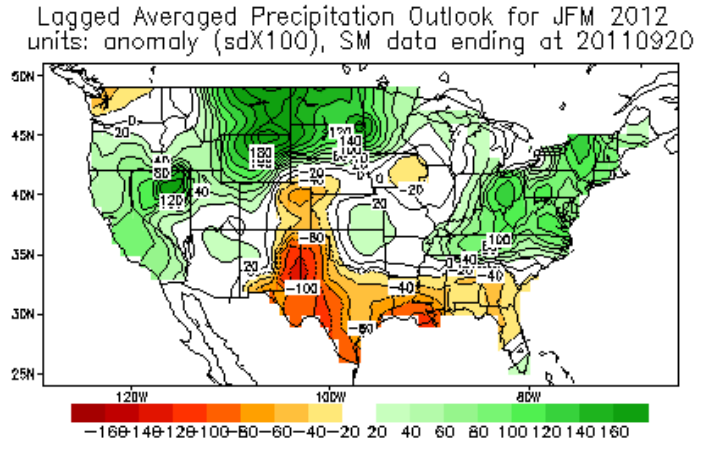


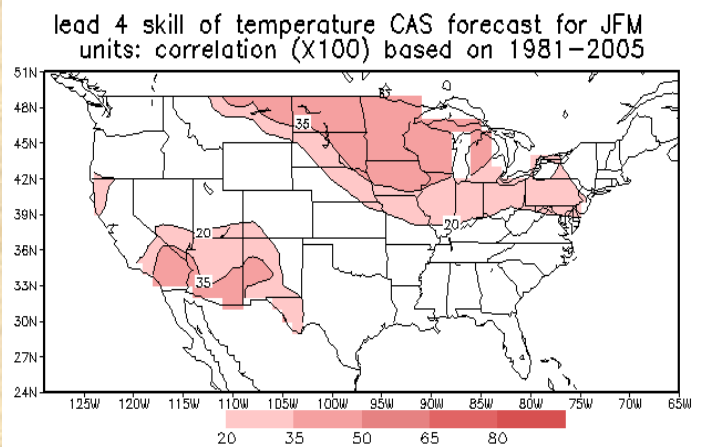
According to yesterday's soil-moisture analog forecast, wet anomalies are favored in northernmost CO along with cooler-than-average temperatures, while drought conditions remain anchored towards the Four Corners and northern TX. Typical skill at this lead-time (right) is quite high over northeast CO where there is a tilt towards wet conditions.

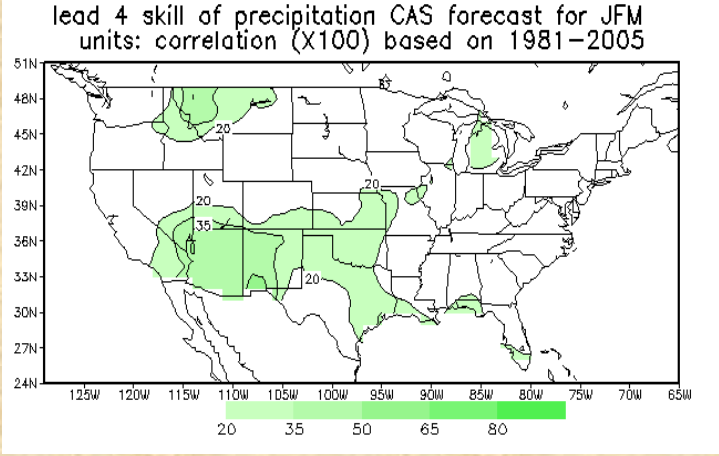
Source: ***http://www.cpc.ncep.noaa.gov/soilmst/cas.shtml***

Climate Prediction Center 'Analog' Forecasts





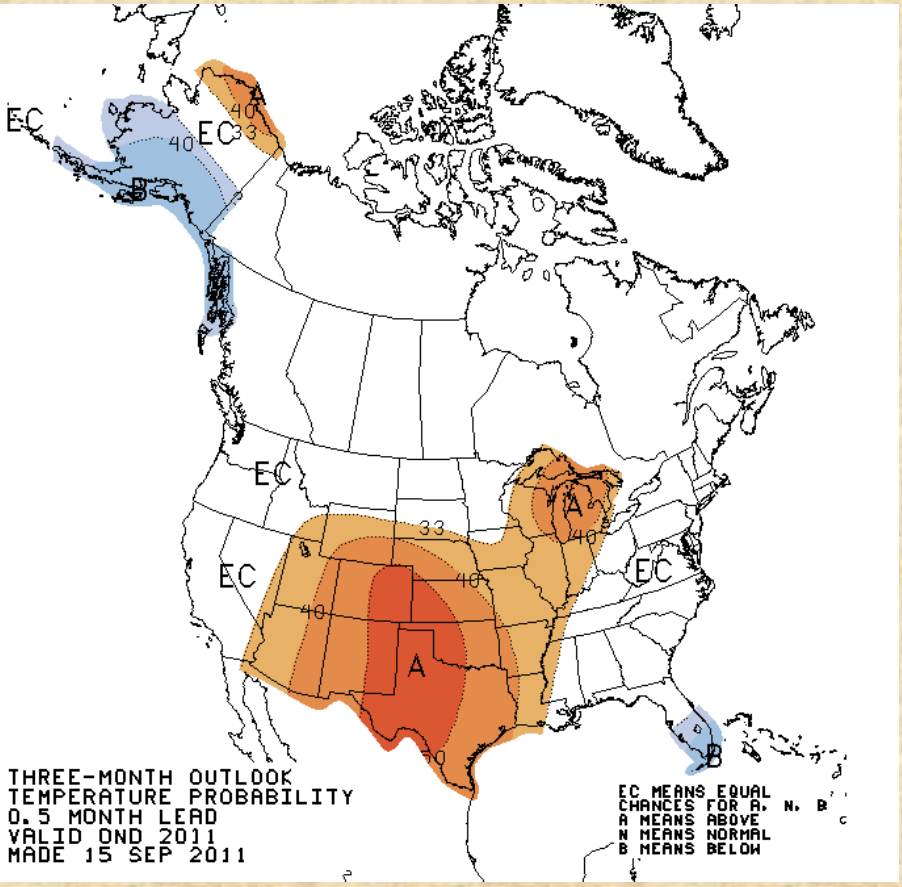


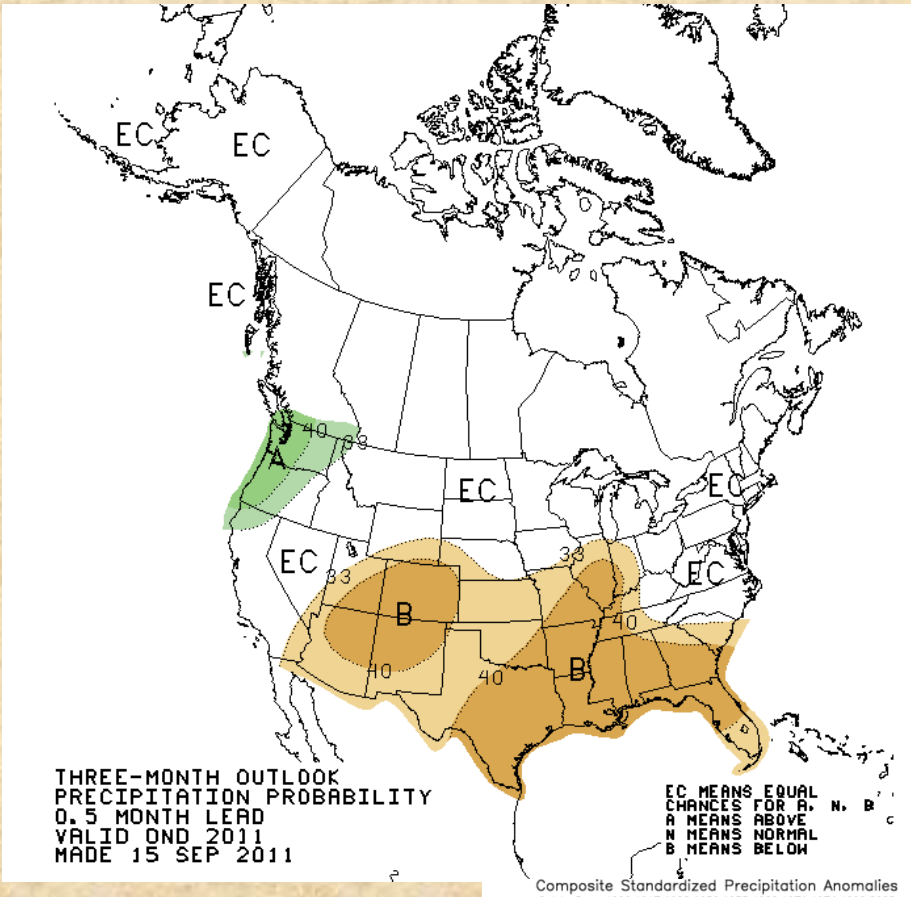


According to yesterday's soil-moisture analog forecast, dry conditions threaten eastern CO in late winter, while our mountains may look forward to a near-normal winter. Typical skill at this long lead-time (right) is high to our south, maintaining drought conditions from eastern NM and most of TX up into SE CO.

Source: ***http://www.cpc.ncep.noaa.gov/soilmst/cas.shtml***

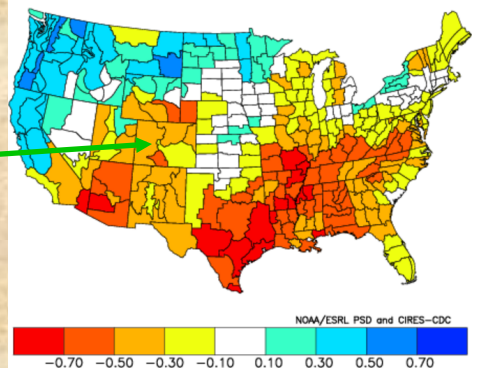
Climate Prediction Center Forecasts



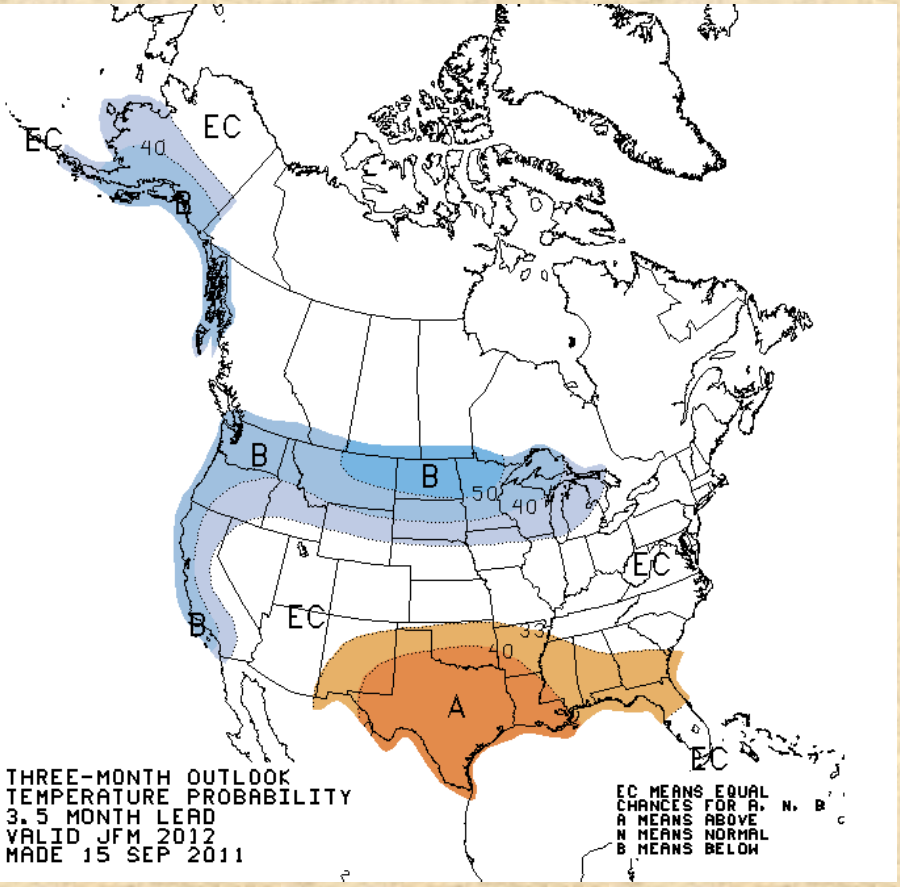


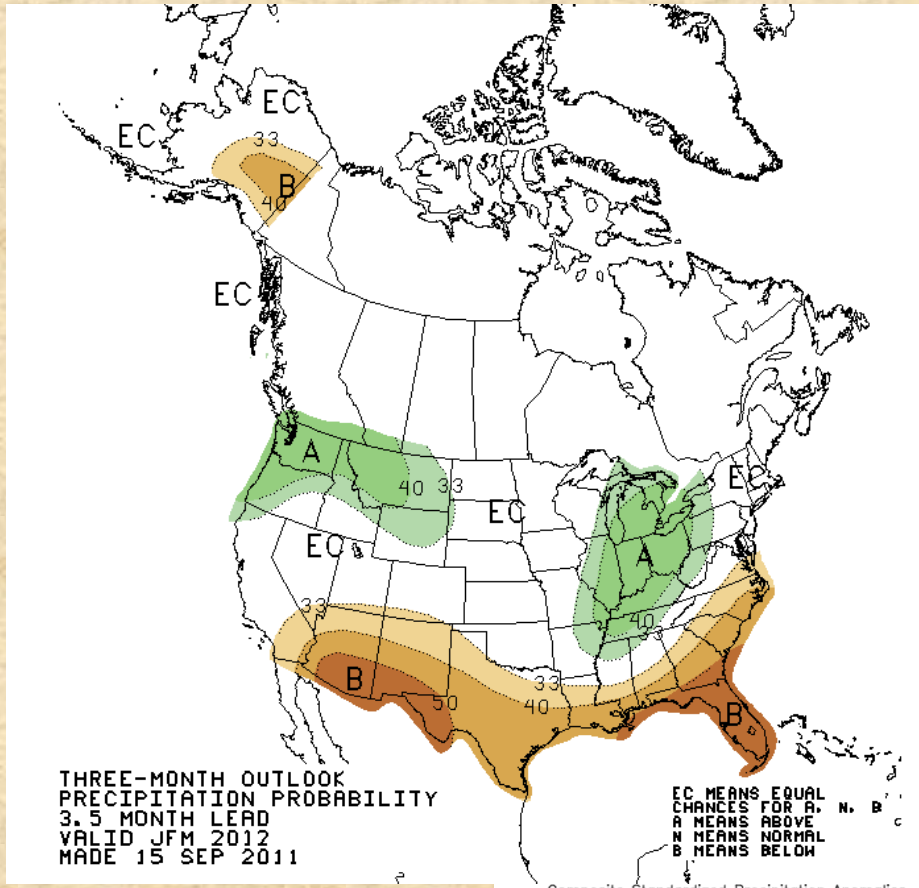
CPC's Oct-Dec (left) temperature forecast expects a warm fall (*La Niña+trend*), especially in already dry eastern CO. Their precipitation forecast (right) keeps it dry for all of us, again, consistent with La Niña-based expectations, *and some composites that I made for 2nd year La Niña conditions*.

Source: ***http://www.cpc.ncep.noaa.gov/products/predictions/***



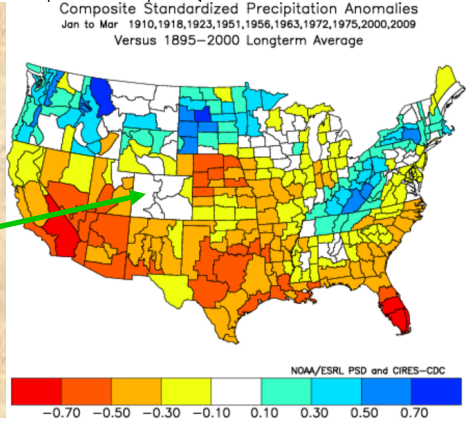
Climate Prediction Center Forecasts



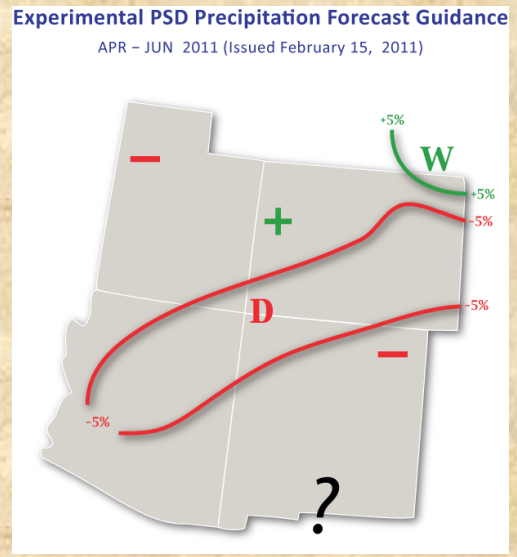


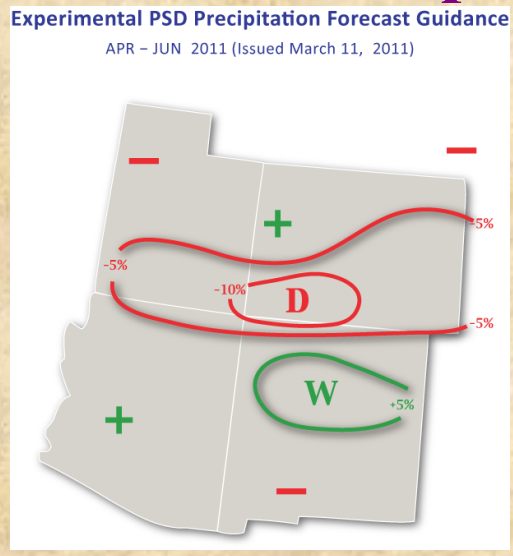
CPC's Jan-Mar '12 (left) temperature forecast expects Colorado to straddle warm anomalies to the south and cold anomalies to the north. A similar picture transpires for precipitation (wet to the north, dry to the south), again, consistent with La Niña-based expectations (*and my composite)*.

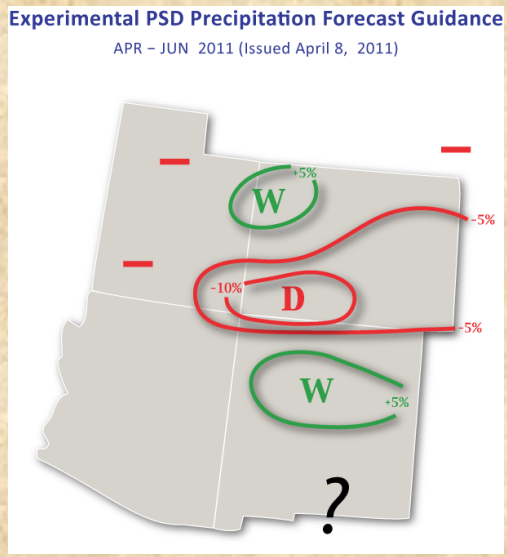
Source: ***http://www.cpc.ncep.noaa.gov/products/predictions/***



Statistical Forecast for April-June 2011

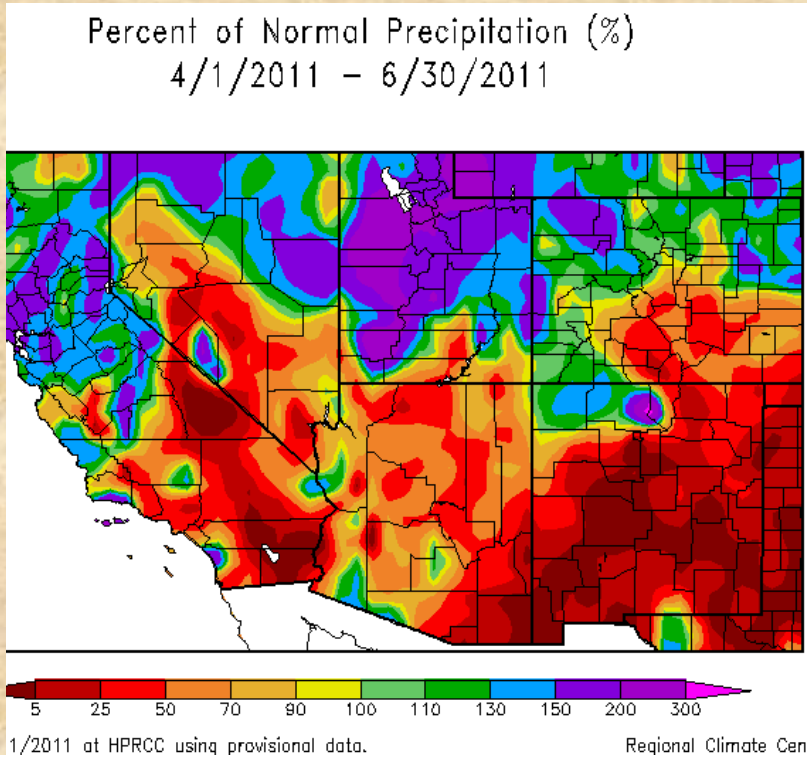




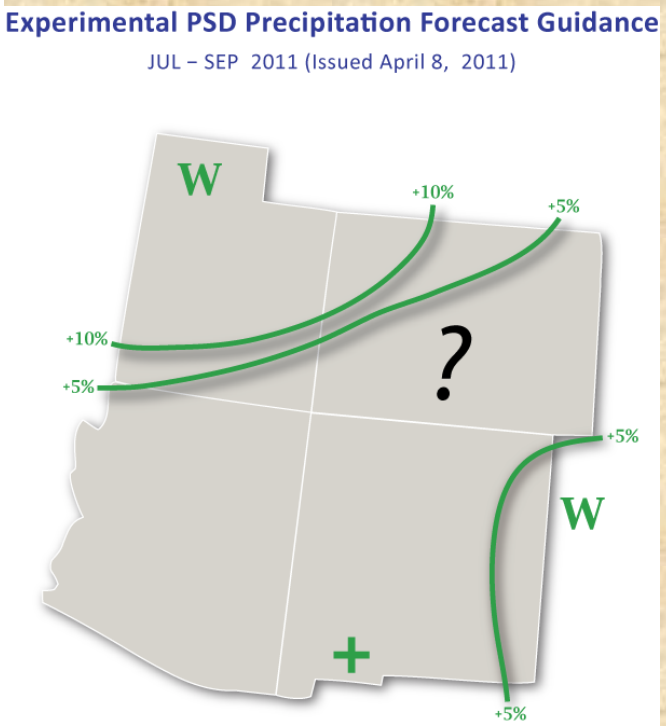


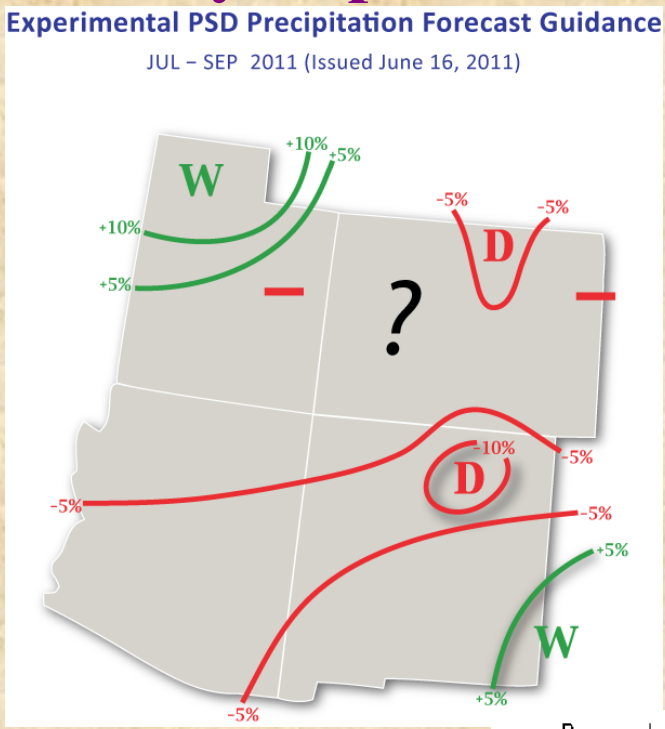
February's (top left), March's (top middle), and April's (top right) forecasts for April-June 2011 were fairly confident that southern CO would see below-normal moisture. The northwestern third of our state had slightly increased chances of being wetter-than-average.

Most of southern CO ended up dry, and northwest CO wet (right). On the other hand, the northeast corner of our state was wetter than expected, ditto for the Four Corners region. IOW, the February forecast panned out better than later updates (also for New Mexico)!



Statistical Forecast for July-September 2011

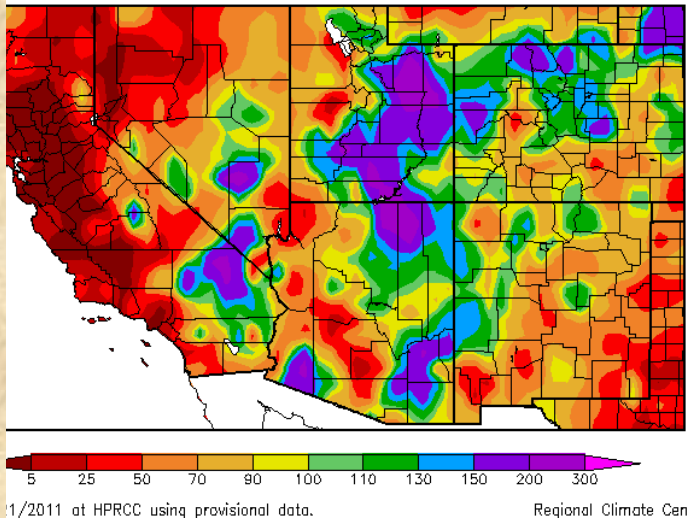




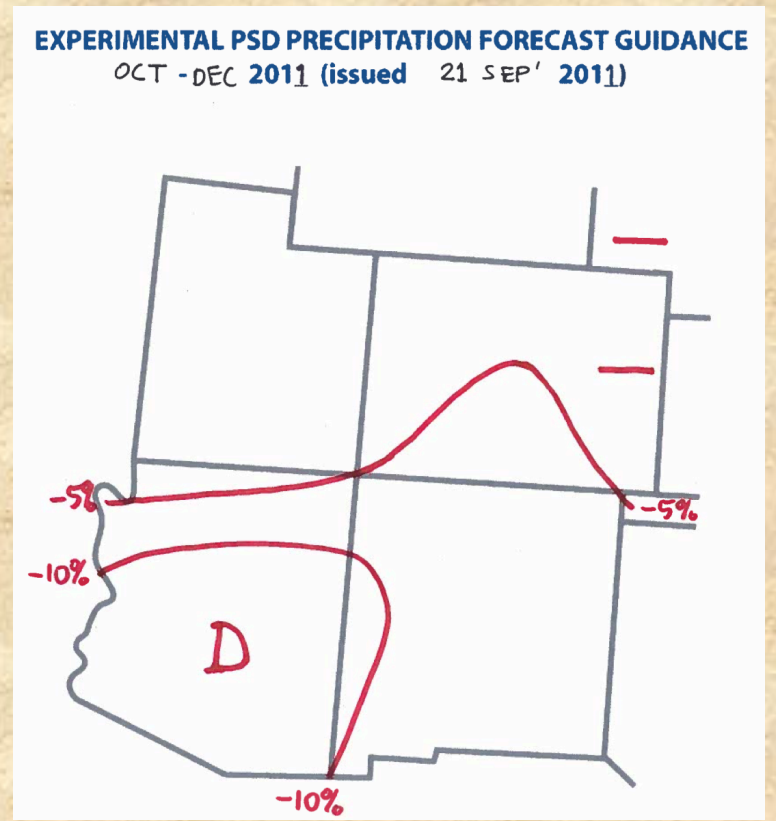
The April forecast for July-September 2011 (left) was optimistic for northwestern CO, and undecided for the rest of the state. The June forecast (top right) was significantly drier, including my 1st dry summer forecast for the eastern plains in more than one decade.

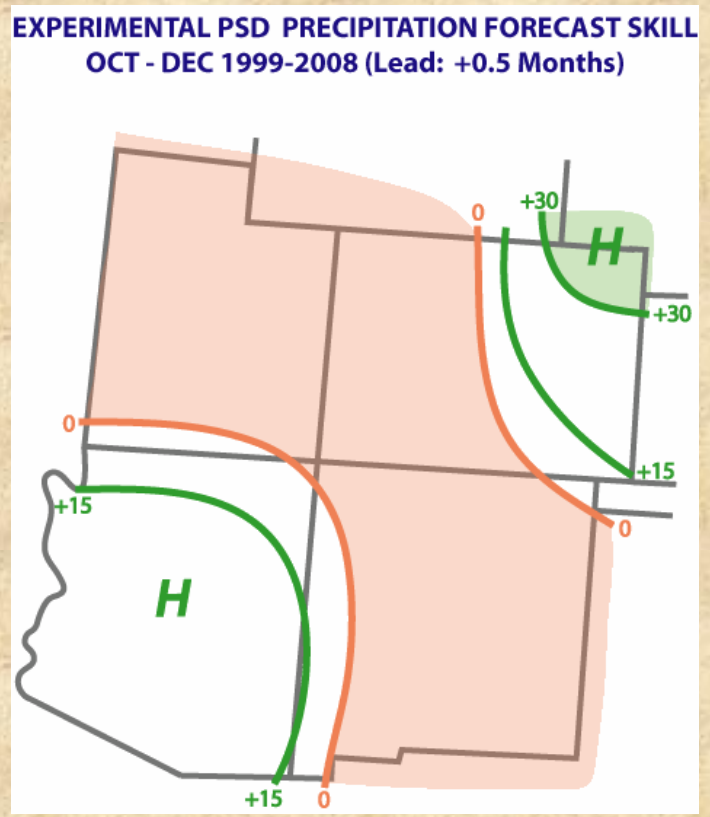
As of yesterday (right), dry conditions have indeed prevailed in much of eastern CO, especially in the Arkansas Valley which was already under drought conditions. Early July wetness (plus a couple of storms this month) have kept us (FR) wetter than expected.

Percent of Normal Precipitation (%)
7/1/2011 – 9/20/2011



Statistical Forecast for Oct-Dec 2011





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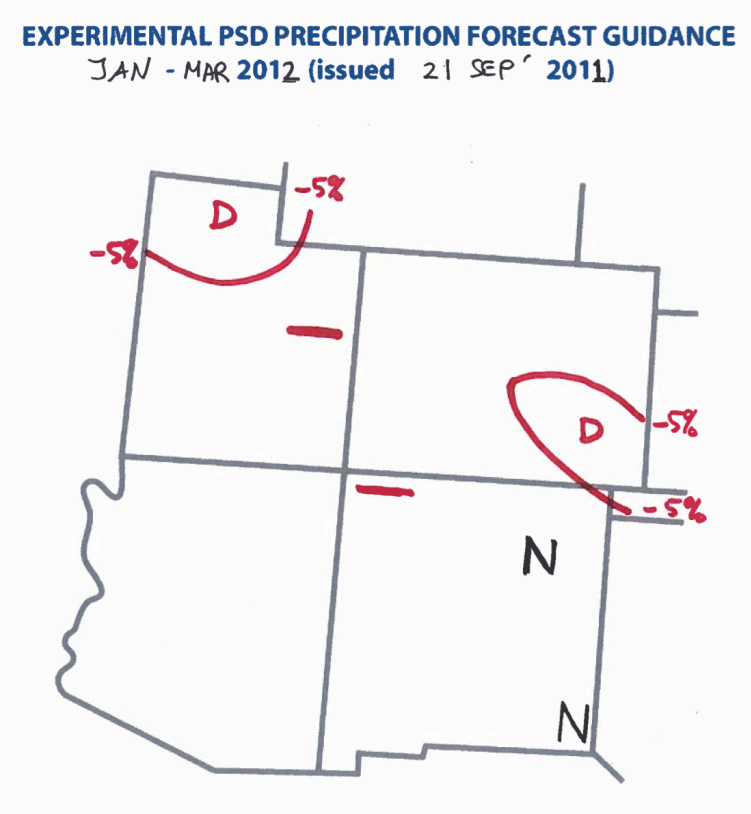
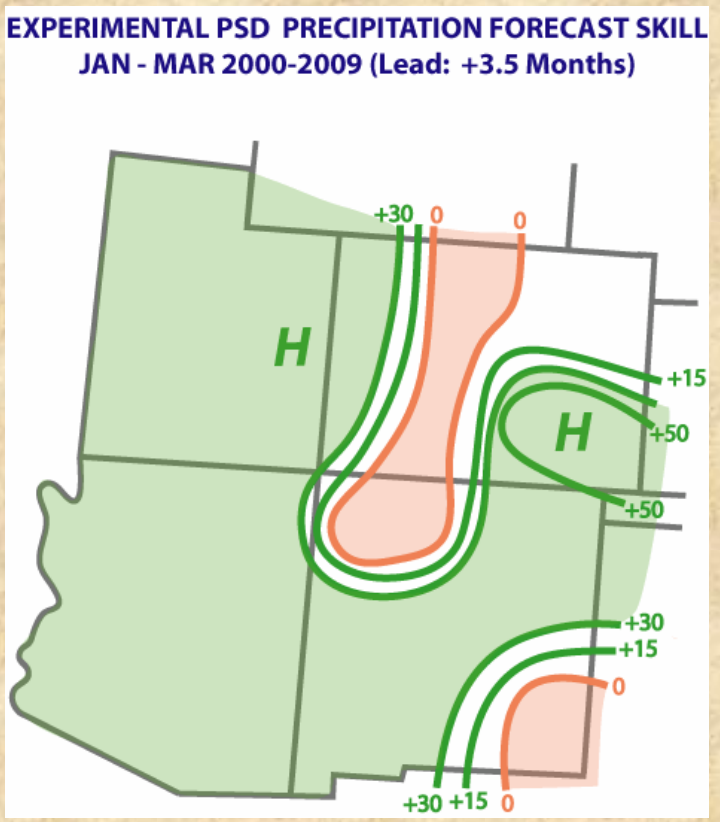
My new forecast for October-December 2011 (left) is leaning towards dry conditions over southern and eastern CO, leaving the West slope and mountains under climatological odds. Verification statistics over the last decade (right) show skill over the dry northeastern plains of CO, but not to the west.

Statistical Forecast for January-March 2012





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My new forecast for January-March 2012 (left) is leaning towards dry conditions over southeastern CO, again leaving the mountains under climatological odds, and the far western valleys and Four-Corners' region with a slight tilt towards a dry late winter. Verification statistics over the last decade (right) show skill for much of the domain, except the higher elevations of CO.

Last year (no forecast issued), my forecast for JFM'11 would have been dry for eastern CO, and at least near-normal for the mountains.

Executive Summary (22 September 2011) – *klaus.wolter@noaa.gov*

1. **La Niña appears to be making a come-back, confirming my long-lead statements from last October. It probably will end up weaker than last winter, but that is less important for impacts than in the El Niño case.**

2. ***The last three months did not see much of a flooding season (√), a late run-off season (no excessive dust √), and a less severe fire season than feared. All in all, Colorado did very well last Water Year, with (near-)record snowpack conditions coming off in the most benign manner possible.***

3. **Along the Front Range, the monsoon season was wetter-than-expected, with a particularly wet start in July, but severe dryness in August. Those rains of early July may have involved recycled moisture from our record-snowpack, IMHO. The next two weeks will see a return of dry/mild conditions, with no prospects for snow (or rain) before September is over.**

4. **My forecast for the next six months is not optimistic, especially for southeastern Colorado. Thanks to La Niña, the mountains have a good chance of getting close to normal snowfall in mid-winter (*to be firmed up in next two months*). A repeat of last year's record-breaking snows is unlikely.**

5. **Bottomline (*Double-Dip La Niña*): In our state, 2nd year La Niña winter half-years are often drier than in the previous year. There is little evidence that would support a contrary (wet) viewpoint. *This statement does not factor in 'rogue atmospheric river events' (like last December) that are currently not predictable at the seasonal time-scale.***